

the arsenic and the sulphur, which formerly prevented the burnt pyrites being put to any use, are got rid of, so that what remains is useful in a further stage of the iron manufacture. But with regard to the extraction of the silver, we find how important a knowledge of even delicate chemical processes is, in order to allow the extraction to be pursued with advantage. By the ingenious process of Mr. Claudet and Mr. Phillips, it is first of all examined by the nicest chemical means to see the exact amount of silver it contains, by a process rivalling in delicacy that which is pursued in laboratory research, and having ascertained exactly the quantity of silver contained in the solution, the exact quantity of extremely expensive reagent, iodide of potassium, which is required, is added to it to precipitate the amount of silver; and when the iodide of silver is thrown down the iodine is recovered to be used over and over again, and the silver itself is set free by means of metallic zinc, which forms iodide of zinc, thus setting free the silver. In this way, a considerable portion of silver is extracted.

I mention this as an illustration of the remarkably close association which is every day taking place between pure chemistry in the laboratory, and manufacturing chemistry in the factory. Now-a-days we have such out-of-the-way bodies, as they were formerly considered, as these different aniline products, as alizarine and chloral, which were formerly barely obvious in the laboratory, now made on a manufacturing scale. On the other hand, we find these different products of estimation, formerly confined to the laboratory, are now carried on in the manufactory, and thereby such an element as silver is produced by processes which are essentially laboratory processes. In this way it happens that we find many improvements in manufacturing chemistry are now produced by men who have obtained a reputation in other fields. For instance, I need scarcely refer to the names of Hoffmann, Perkin, and Nicholson, gentlemen known as scientific chemists and men of the highest eminence, before their attention was directed to manufacturing operations, and they realise on a manufacturing scale the results of their laboratory experience. In mentioning them, I ought not certainly to dissociate from them our lecturer this evening, Mr. Field, who was so long and so highly esteemed in purely scientific circles for his admirable researches into a great number of compounds, more especially connected with mineral chemistry, before he devoted his great ability to the elucidation and improvement of the manufacture of aniline dyes, and subsequently to these metamorphoses of the bodies which we now use for illuminating purposes in the form of paraffine and ozokerit, and also the other candles which are composed of stearic acid, palmitic acid, and so on.

But while in this way manufactures derive a very great advantage from the light thrown on them by purely scientific chemists in one way or another, I do not think we ought to overlook the benefit which pure chemistry derives, on the other hand, from manufacturing operations. I do not mean the mere material gain that purely scientific chemists have enjoyed by the opportunity of examining minutely a great number of bodies, which previously it was almost impossible for them to obtain, but I think they have gained a very much greater knowledge of the especial subject of their studies—I mean chemical phenomena. We chemists take in our province every change by which one kind of matter becomes metamorphosed into another kind of matter, whereby that which was ironstone, for instance, becomes iron, whereby that which was sand, chalk, and soda becomes glass, and which takes place wherever one kind of matter is metamorphosed into another; but, after all, a great number of the metamorphoses which we must study take place in the test-tube and small vessels of similar character; and we are rather too apt, I say, to shut our eyes to those metamorphoses which take place on a large scale around us.

Those changes manifest themselves particularly in two forms. We have those by which the different forms of agricultural produce are furnished us by the vegetable kingdom, and by which they are metamorphosed into the animal kingdom. Here we have one great illustration of industrial chemistry—the chemistry by which crops are produced, and by which stock is fed and flesh is made. This feeding of stock and production of crops is one very large function of industrial chemistry, and I would venture to say that any scientific chemist who devotes his attention entirely to what takes place in the test-tube, and who neglects those changes which are constantly taking place around him, has a very imperfect notion of the subjects which he professes to investigate. And in addition to these changes thus taking place in natural processes, modified to a certain extent by art, we have three other processes which take place on a grand scale, by which from such substances as ironstone we produce metallic iron, from common salt, on the one hand, carbonate of soda, applied to the manufacture of glass and other useful purposes, and by which we provide also chlorine in its different combinations, applicable to so many purposes, more particularly in the preparation of our wearing apparel, and in our linen and fabrics of every description.

I think, then, that when we have the advantage of having these industrial subjects brought under our notice by men like our friend here, who are familiar, on the one hand, with the most recondite points of theoretical chemistry, and, on the other hand, with the greatest practical achievements which have been obtained in manufacturing chemistry, it will be of immense benefit to those who wish to study chemistry in its pure aspect, as they will see what can be done on a large scale, and what habitually is done, and what perseverance, assisted with chemical knowledge, has obtained for us. It must also be interesting to practical men, by throwing out suggestions capable of improvement in various branches of manufacturing art. I think, then, that the Society of Arts has really done a very useful work in bringing together men engaged in the purely scientific pursuit of chemistry on the one hand, and, on the other, men who are pursuing the application of the science with a view to the practical good of their kind. I do not know that I need trouble you with any further remarks, but I have attended here this evening with the greatest pleasure, because I feel how much advantage is likely to be derived by all classes of the community by the discussion of these problems which are so interesting to all, and I would venture to say as much in a purely scientific as in a practical point of view.

NOTES

SUFFICIENT attention has not been attracted to the fact that one of the recommendations of the Committee on Scientific Instruction has borne early fruit. Mr. Phillips Jodrell, desirous to promote research in physiology, has attached to the professorship of that science in University College, London, an endowment of 7,500*l.* to enable the professor to devote to biological investigation whatever time is not needed for the discharge of his duties as lecturer. This endowment is accompanied by the further sum of 500*l.*, to be expended in the purchase of the necessary apparatus. It is difficult to speak in terms sufficiently high of Mr. Phillips Jodrell's intelligent munificence, which, we have no doubt, will bear good fruit. It is gratifying that the recommendations of the Commission have so far had such an excellent result, and we only hope that Mr. Jodrell's handsome example will be largely followed by others who have enough and to spare.

OUR readers will no doubt learn with surprise and regret that M. Alglave, editor of the *Revue Scientifique*, and Professor of

Law in the faculty of Douai, has been suspended from his professorial duties for one month, and has received notice that he must either resign his position as professor or give up the editorship of the *Revue Scientifique*. The reason for this vexatious proceeding we have not learned; but to outsiders it must seem a wanton and mischievous exercise of authority, although the fearless way in which the *Revue* states scientific facts and conclusions may have something to do with it. The *Revue Scientifique* holds the first rank among French scientific journals, contains from week to week the cream of scientific work both French and foreign, and any interference with its efficiency would be a great blow to the cause of Science in a country where a knowledge of the methods and solid results of Science is much needed. If the threat with which M. Alglave is menaced be carried out, those who thus abuse their little brief authority will be despised by the whole educated world. We read in the *Progrès du Nord* that M. Terrat has been appointed to take M. Alglave's place, and that when the former entered the class-room the students retired silently and in perfect order, leaving M. Terrat to lecture to the walls of the amphitheatre and two members of the *Cercle Catholique* who did not deem it prudent to join in the protest of their class-fellows; the students, we believe, have presented to their professor a unanimous address of sympathy. Let us hope that before the expiry of the month those who are responsible for this treatment of M. Alglave will think better of it, and restore the professor to the position he appears to have filled so well, permitting him at the same time to retain charge of the journal which is among the things that reflect the highest credit on France.

THE Chimpanzee, which during the last two and three-quarter years has been an endless source of instruction and amusement to visitors at the Zoological Gardens, after an illness of two months' duration, died on Friday last. The post-mortem examination showed that the cause of death was acute tuberculosis of the peritoneum, almost exclusively confined to the serous membrane covering the liver and spleen, the omentum and small intestine being slightly affected. A large bronchial gland was on the verge of suppuration, but the lungs were healthy. There were no symptoms of hectic during life, and much subcutaneous and omental fat were found after death.

THE French Meteorological Society has resolved to hold an extraordinary *réunion* during Easter-week, a time when a considerable number of French and foreign meteorologists are in Paris. This meeting has for its object to strengthen the relations which exist between the Society and provincial observers, and to study in common questions of general interest in meteorology.

THE Meteorological Office has resolved, in compliance with the wish of the majority of subscribers to the lithographed sheets of hourly readings from their observatories, which are about to appear, to issue the sheets in monthly, not quarterly parts.

IN addition to the *Bulletin Météorologique du Nord*, of which we lately announced the publication, we are glad to learn that Capt. Hoffmeyer, the Director of the Meteorological Institute of Denmark, has commenced the issue of a daily lithographed chart, for his own country, Norway, Sweden, and North-west Russia. He has also published an explanation of the chart for the use of subscribers. This chart is most valuable, as it supplements our own daily weather charts and those of the *Bulletin International*, for a district whence accurate information is seldom obtainable by telegraph in Western Europe.

IN a recent number we intimated that the Perthshire Society of Natural Science had interrogated the Parliamentary candidates for the county and city of Perth as to their opinions on the questions of State help to Science, a responsible Minister of Education, and the promotion of Scientific Exploring expeditions.

Answers—favourable, we are glad to say—were returned at the time only by the two Conservative candidates, one of whom, Sir W. Stirling Maxwell, is now M.P. for Perthshire. We are now glad to give place to the somewhat tardy reply, addressed to the secretary, of the Hon. Arthur Kinnaird, Member for the City of Perth:—"I, Pall Mall East, 18th Feb. 1874.—Dear Sir,—I was surprised to find copied into a London paper from a Scotch journal the questions put in your letter of the 29th January last, with the statement that they had not been answered by me. The fact of my being, as I believe I am, one of the patrons of the Perthshire Society of Natural Science should have been, it appears to me, a sufficient guarantee of my approval of the objects of your institution; and my active co-operation with Capt. Wells in his efforts during the last session of Parliament to obtain the sanction of Government to a proposed grant for the furtherance of Arctic exploration, further approves my appreciation of the objects you advocate, in my willingness to support State expenditure for well-devised schemes of scientific research and educational purposes.—Yours truly, A. Kinnaird."

H. N. MARTIN, B.A., Cantab, D.Sc. Lond., has been appointed Lecturer on Physiology at Christ's College, Cambridge. Dr. Martin obtained an open scholarship for Natural Science at Christ's College, and graduated in the Natural Sciences Tripos, obtaining the first place. Lately he has acted as assistant to Dr. Michael Foster in the Physiological Laboratory of the University. A paper by Dr. Martin on the "Structure of the Olfactory Mucous Membrane" appeared in the last number of the *Journal of Anatomy*, and was reprinted in the Studies from the Physiological Laboratory of the University, Cambridge, edited by Dr. Michael Foster.

THERE will be offered, at the Matriculation exhibition at New College, Oxford, beginning on Wednesday, May 21, at 9 A.M., two Exhibitions, tenable for three years, of the annual value of 50*l.* each. These Exhibitions are open to all persons who have not already been matriculated at another College. In the election to one of the Exhibitions a preference will be given to proficiency in Natural Science, if there is any candidate of sufficient merit in the judgment of the examiners. Further account of the examination will be supplied on application to the Warden.

THE Science and Art Department has published a catalogue of apparatus for teaching chemistry, containing 112 items, with prices from which a deduction of 50 per cent. is given. We should advise all our readers who are interested in the subject to obtain the catalogue. The same Department has also formed a collection of travelling apparatus for illustrating instruction in Physical Geography, which will be lent, for a short time, to teachers of the subject referred to. The apparatus consists of a set of physical maps of the world and the various continents, by Prof. Sydow, models of Mount Vesuvius, of Mont Blanc, and of the Thames Valley.

WE regret to record the death of Dr. Forbes Winslow, which took place at Brighton on the 3rd instant, at the age of 63 years.

WE formerly announced the proposal for an international memorial to Captain Maury, which is to take the shape of a Lighthouse on the Rocos, to the importance of which Maury called attention in his "Sailing Directions." We learn from *Ocean Highways* that the President of the Board of Visitors of the Virginian Military Institute addressed a letter to the Governor of Virginia on January 23, requesting him to lay the question of the Maury memorial before the General Assembly, for such moral support as may fitly be given by the representatives of a State which gave Maury to the world. A joint committee of members of the Senate and House of Delegates has since been appointed; and the hearty co-operation of the Govern-

ments and Scientific Societies in Europe is confidently expected; for Maury's services have benefited not his own country only, but the maritime interests of the whole world.

On the 19th of February, Dr. Peters, of Hamilton College, New York, discovered a planet in 11^h 19^m right ascension, plus 4 deg. 25^m declination.

M. CHARLES SAINTE CLAIRE DEVILLE, the meteorologist, announced publicly before the French Institute, that the week from March 9 to 16 would be a very cold one. The prognostication is in a fair way of being fulfilled.

THE last scientific letter written by the lamented M. Quetelet was to General Myer, the Director of the American Meteorological Service. Its purpose was to inaugurate the daily intercommunication of meteorological news between the States and Belgium. The scheme so originated is working regularly and was not interfered with by the death of the learned and respected Belgian astronomer.

THE *Lancet* says that the authorities of the University of Aberdeen have now under consideration a proposal to institute a new degree in arts—that of Bachelor of Science.

HERR VON DEM BORNE writes to the *Deutsche Fisherei Verein*, in Berlin, that he is at present occupied upon an exhaustive treatise, on the most recent and best methods and implements of fishing with the hook and line, especially as used in England and North America, and is desirous of receiving information on these subjects from dealers and others, to be embodied in his proposed work.

VELOCIPEDES are becoming an institution in Paris for forwarding messages from the Exchange (Bourse) to the central telegraphic office, rue de Grenelle. The rates charged by "velocemen" are two shillings. The run there and back, including delivery of messages, takes about 25 minutes for a distance of 3 miles 1,320 yards. It is contemplated by some speculators to establish a public company. When Marshal Bazaine's trial was going on, velocipedes were used for conveying messages from Versailles for the *Moniteur*, one of the Parisian papers. The single run was charged a pound sterling, and was accomplished in 45 minutes for a distance of 12½ miles, at a quicker rate than the railway trains. But the road descends all the way, Versailles being on a higher level than Paris, and the railway is circuitous; stoppages are also very frequent on the line.

CARRIER-PIGEONS are largely used by Parisian periodicals for carrying latest intelligence. They start from Versailles from two o'clock in the afternoon till three. The average number is thirty pairs, and the charge four shillings each pair. The journey is accomplished in twelve minutes when fogs are not frequent. It is not legal for newspaper editors to hire a wire for their private use.

M. HENRY GIFFARD, the inventor of the *Injecteur*, has constructed a railway carriage with a patent suspension of his invention, which prevents the passengers from feeling any inconvenience from oscillation. The first public experiments will be on the Versailles railway, just after the impending parliamentary holidays.

THE election of a successor to the late Dr. Nelaton has given rise to a severe contest in the Secret Committee of the French Academy of Sciences; for more than a month it has obstructed the usual routine of the Academy. The reports for yearly prizes, which are ready for adoption, were not read over. The number of competitors is greater than usual, amounting to seven.

THE Parisian Municipal Corporation has decided upon the building of a large bridge on the Seine, which in point of length will be equal to Blackfriars or Waterloo Bridge, London; but

instead of being placed at right angles to the current, it will be placed in an oblique direction. This extraordinary step is taken to connect the rue des Etats on the left bank with the old arsenal quarter on the right bank.

M. FIGUIER has issued through Hachette his *Année Scientifique*. It is the 17th volume of the whole series.

AN International Agricultural Exhibition is to be held on a grand scale at Bremen, under the patronage of the Crown Prince of Germany, from June 13—21 next. The North German Lloyd will grant special facilities to the English exhibitors for the conveyance of implements from London, Southampton, and Hull.

THE enormous extent of the destruction of buffaloes on the Western plains of the United States seems to have undergone no diminution during the present winter, and there is every reason to fear that, should this continue a few years longer, the animal will become as scarce as is its European congener at the present day. At present, thousands of buffaloes are slaughtered, every day, for their hides alone, which, however, have glutted the market to such an extent that, whereas, a few years ago, they were worth three dollars apiece at the railroad stations, skins of bulls now bring but one dollar, and those of cows and calves sixty and forty cents, respectively. A recent short surveying expedition in Kansas led to the discovery of the fact that, on the south fork of the Republican, upon one spot, were to be counted six thousand five hundred carcasses of buffaloes, from which the hides only had been stripped. The meat was not touched, but left to rot on the plains. At a short distance hundreds more of carcasses were discovered, and, in fact, the whole plains were dotted with putrefying remains of buffaloes. It was estimated that there were at least two thousand hunters encamped along the plains, hunting the buffalo. One party of sixteen stated that they had killed twenty-eight hundred during the past summer, the hides only being utilised.

A COPY of the Calendar for 1873-4, of the Imperial College of Engineering, Tokyo, Japan, has been forwarded us. The course of study prescribed, both general and special, theoretical and practical, and the regulations for the government of the College, appear to us to be all that at present could be desired.

WE are asked to state that the Annual Dinner of the members of the Institution of Civil Engineers has been appointed to take place at Willis's Rooms, St. James's, on Saturday, March 21. Mr. T. E. Harrison, the president, will occupy the chair.

WE are glad to see that Guido Cora's well-conducted Italian geographical journal, *Cosmos*, is to be henceforth issued monthly, instead of every two months.

AN aeronautical society of Paris, the "Aërial Sport," has published a programme of an aerial spring meeting to be held in the neighbourhood of Paris, very likely Vesinet. The object is to send in the air small fire balloons carrying *des mèches allumées*, whose length has been calculated so that the cargo of the balloon may fall close to a post chosen. Every champion is to choose his own wind; but nobody has a right to approach closer to the post than three miles. It is a kind of drill for shelling a place with balloons by taking advantage of the wind.

THE additions to the Zoological Society's Gardens during the last week include a Javan Rhinoceros (*Rhinoceros sondaicus*) from Java, purchased; a Negro Tamarin (*Midas ursulus*) from North Brazil, presented by Mr. W. Thomson; two Goshawks (*Astur palumbarius*), European, one presented and the other deposited by Mr. G. Lascelles; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mr. S. Waight; two Verreaux, Guinea Fowl (*Numida eduardi*) from East Africa; two Crowned Pigeons (*Goura coronata*) from New Guinea, and a Common Cassowary (*Casuarus galeatus*) from Ceram, purchased.